

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/012462

## A. CLASSIFICATION OF SUBJECT MATTER

IPC 7 G01N33/574 C12Q1/68

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G01N C12Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal, BIOSIS, WPI Data, EMBASE

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>DATABASE BIOSIS [Online]  BIOSCIENCES INFORMATION SERVICE,  PHILADELPHIA, PA, US;  16 November 2002 (2002-11-16),  KOHLMANN ALEXANDER ET AL: "Gene Expression  Profiles of t(11q23)/MLL Positive ALL and  AML."  XP002269818  Database accession no. PREV200300356357  abstract  &amp; BLOOD,  vol. 100, no. 11,  16 November 2002 (2002-11-16), page  Abstract No. 308,  44th Annual Meeting of the American  Society of Hematology; Philadelphia, PA,  USA; December 06-10, 2002  ISSN: 0006-4971</p> <p>-----  -/-</p>	1-27

☒ Further documents are listed in the continuation of box C.☒ Patent family members are listed in annex.

## \* Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art

"Z" document member of the same patent family

Date of the actual completion of the international search

3 March 2005

Date of mailing of the international search report

09.06.2005

Name and mailing address of the ISA

European Patent Office, P.B. 5818 Patentlaan 2  
NL - 2280 HV Rijswijk  
Tel. (+31-70) 340-2040, Tx. 31 651 epo nl,  
Fax: (+31-70) 340-3016

Authorized officer

Thumb, W

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/012462

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>TSUTSUMI SHUICHI ET AL: "Two distinct gene expression signatures in pediatric acute lymphoblastic leukemia with MLL rearrangements"</p> <p>CANCER RESEARCH, AMERICAN ASSOCIATION FOR CANCER RESEARCH, BALTIMORE, MD, US, vol. 63, no. 16, 15 August 2003 (2003-08-15), pages 4882-4887, XP002272402</p> <p>ISSN: 0008-5472</p> <p>the whole document</p>	1-27
Y	<p>-----</p> <p>DATABASE BIOSIS [Online]</p> <p>BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US; 16 November 2002 (2002-11-16),</p> <p>MOSQUERA-CARO MONICA ET AL: "Heterogeneity of Gene Expression Profiles in MLL-Associated Infant Leukemia: Identification of Distinct Expression Profiles and Novel Therapeutic Targets for Each MLL Translocation Variant."</p> <p>XP002276638</p> <p>Database accession no. PREV200300357077</p> <p>abstract &amp; BLOOD, vol. 100, no. 11, 16 November 2002 (2002-11-16), page Abstract No. 2943, 44th Annual Meeting of the American Society of Hematology; Philadelphia, PA, USA; December 06-10, 2002</p> <p>ISSN: 0006-4971</p>	1-27
Y	<p>-----</p> <p>ARMSTRONG SCOTT A ET AL: "MLL translocations specify a distinct gene expression profile that distinguishes a unique leukemia"</p> <p>NATURE GENETICS, vol. 30, no. 1, January 2002 (2002-01), pages 41-47, XP002276635</p> <p>ISSN: 1061-4036</p> <p>the whole document</p>	1-27
Y	<p>-----</p> <p>ARMSTRONG SCOTT A ET AL: "MLL-rearranged leukemias: Insights from gene expression profiling."</p> <p>SEMINARS IN HEMATOLOGY, vol. 40, no. 4, October 2003 (2003-10), pages 268-273, XP009029193</p> <p>ISSN: 0037-1963 (ISSN print)</p> <p>the whole document</p> <p>-----</p> <p style="text-align: center;">-/--</p>	1-27

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/012462

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	ROZOVSKAIA T ET AL: "Upregulation of Meis1 and HoxA9 in acute lymphocytic leukemias with the t(4:11) abnormality" ONCOGENE, vol. 20, no. 7, 15 February 2001 (2001-02-15), pages 874-878, XP002276636 ISSN: 0950-9232 abstract	1-27
Y	----- SCHOCH CLAUDIA ET AL: "AML with 11q23/MLL abnormalities as defined by the WHO classification: Incidence, partner chromosomes, FAB subtype, age distribution, and prognostic impact in an unselected series of 1897 cytogenetically analyzed AML cases." BLOOD, vol. 102, no. 7, 1 October 2003 (2003-10-01), pages 2395-2402, XP002276637 ISSN: 0006-4971 the whole document	1-27
Y	----- WO 03/039443 A (DEUTSCHES KREBSFORSCH ;HAERLACH TORSTEN (DE); EILS ROLAND (DE); K) 15 May 2003 (2003-05-15) the whole document	1-27
Y	----- KOHLMANN A ET AL: "MOLECULAR CHARACTERIZATION OF ACUTE LEUKEMIAS BY USE OF MICROARRAY TECHNOLOGY" GENES, CHROMOSOMES & CANCER, XX, XX, vol. 37, no. 4, August 2003 (2003-08), pages 396-405, XP008025253 the whole document in particular table 2	1-27
Y	----- HAERLACH T ET AL: "The Diagnosis of 14 Specific Subtypes of Leukemia Is Possible Based on Gene Expression Profiles: A Study on 263 Patients with AML, ALL, CML, or CLL" BLOOD, W.B.SAUNDERS COMPAGNY, ORLANDO, FL, US, vol. 100, no. 11, 16 November 2002 (2002-11-16), page 139A, XP002263227 ISSN: 0006-4971 the whole document	1-27
Y	----- EP 1 043 676 A (WHITEHEAD BIOMEDICAL INST) 11 October 2000 (2000-10-11) the whole document	1-27
	----- -/--	

## INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/012462

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
Y	<p>GOLUB T R ET AL: "Molecular classification of cancer: Class discovery and class prediction by gene expression monitoring"</p> <p>SCIENCE, AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE,, US, vol. 286, no. 5439, 15 October 1999 (1999-10-15), pages 531-537, XP002207658</p> <p>ISSN: 0036-8075</p> <p>cited in the application</p> <p>the whole document</p> <p>-----</p>	1-27
Y	<p>DUGAS M ET AL: "A comprehensive leukemia database: integration of cytogenetics, molecular genetics and microarray data with clinical information, cytomorphology and immunophenotyping"</p> <p>LEUKEMIA, MACMILLAN PRESS LTD, US, vol. 15, no. 12, December 2001 (2001-12), pages 1805-1810, XP002263731</p> <p>ISSN: 0887-6924</p> <p>the whole document</p> <p>-----</p>	1-27
Y	<p>DUGAS MARTIN ET AL: "Impact of integrating clinical and genetic information."</p> <p>IN SILICO BIOLOGY, vol. 2, no. 3, 2002, pages 383-391, XP001179418</p> <p>ISSN: 1386-6338 (ISSN print)</p> <p>the whole document</p> <p>-----</p>	1-27
A	<p>ALIZADEH A ET AL: "THE LYMPHOCHIP: A SPECIALIZED CDNA MICROARRAY FOR THE GENOMIC-SCALE ANALYSIS OF GENE EXPRESSION IN NORMAL AND MALIGNANT LYMPHOCYTES"</p> <p>COLD SPRING HARBOR SYMPOSIA ON QUANTITATIVE BIOLOGY, BIOLOGICAL LABORATORY, COLD SPRING HARBOR, NY, US, vol. 64, no. 1, 1999, pages 71-78, XP001099007</p> <p>ISSN: 0091-7451</p> <p>the whole document</p> <p>-----</p>	1-27
A	<p>DATABASE BIOSIS [Online]</p> <p>BIOSCIENCES INFORMATION SERVICE, PHILADELPHIA, PA, US;</p> <p>16 November 2002 (2002-11-16), KOHLMANN ALEXANDER ET AL: "A Simplified and Partially Automated Target Preparation Method for Gene Expression Profiling."</p> <p>XP002269495</p> <p>Database accession no. PREV200300367771</p> <p>abstract</p> <p>-----</p> <p>-/--</p>	1-27

# INTERNATIONAL SEARCH REPORT

International application No.  
PCT/EP2004/012462

## Box II Observations where certain claims were found unsearchable (Continuation of item 2 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☒ Claims Nos.:  
because they relate to subject matter not required to be searched by this Authority, namely:  
**Article 52 (2)(d) EPC - Presentation of information**  
  
The claims were only searched with regards to the underlying method of generating a reference data base for distinguishing leukemia subtypes.
2. ☐ Claims Nos.:  
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
3. ☐ Claims Nos.:  
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

## Box III Observations where unity of invention is lacking (Continuation of item 3 of first sheet)

This International Searching Authority found multiple inventions in this International application, as follows:

see additional sheet

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☒ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:  
**1-27 ( partially)**

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.  
☐ No protest accompanied the payment of additional search fees.

## FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

This International Searching Authority found multiple (groups of) inventions in this international application, as follows:

1. claims: 1-27 (partially)

A method for distinguishing (11q23)/MLL positive leukemias from t(11q23)/MLL negative leukemias, in particular de-novo AML from therapy-related AML, the method comprising determining the expression level of the marker eukaryotic translation elongation factor 1 epsilon 1 (EEF1E1). Use of said marker for the manufacture of a diagnostic. A diagnostic kit containing said marker and an apparatus comprising a reference data bank, wherein the reference data bank is obtainable by determining the expression level of EEF1E1.

---

2. claims: 1-27 (all partially)

Inventions 2-550

Methods for distinguishing t(11q23)/MLL positive leukemias from t(11q23)/MLL negative leukemias, including the subtypes ALL or AML with t(11q23)/MLL, de-novo AML, therapy-related AML, ALL and AML with MLL/t(11;19), ALL with t(4;11), AML with MLL/t(9;11) and AML with MLL/t(6;11) and methods for distinguishing specific subtypes against all other subtypes and against each other, the method comprising determining individually the expression level of the markers listed in table 1, positions 2-50, and in tables 2-7. Use of said markers for the manufacture of diagnostics. Diagnostic kits containing said markers and apparatus comprising a reference data bank, wherein the reference data bank is obtainable by determining the expression levels of said markers.

---

# INTERNATIONAL SEARCH REPORT

International Application No

PCT/EP2004/012462

## C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
	<p>&amp; BLOOD, vol. 100, no. 11, 16 November 2002 (2002-11-16), page Abstract No. 4287, 44th Annual Meeting of the American Society of Hematology; Philadelphia, PA, USA; December 06-10, 2002 ISSN: 0006-4971</p> <p>-----</p>	

# INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/EP2004/012462

Patent document cited in search report		Publication date	Patent family member(s)	Publication date
W0 03039443	A	15-05-2003	EP 1308522 A1	07-05-2003
			W0 03039443 A2	15-05-2003
			EP 1470247 A2	27-10-2004
-----				
EP 1043676	A	11-10-2000	CA 2304876 A1	09-10-2000
			EP 1043676 A2	11-10-2000
			JP 2001017171 A	23-01-2001
			US 2003017481 A1	23-01-2003
			US 6647341 B1	11-11-2003
			US 2003073083 A1	17-04-2003
-----				